

Three new genera of Neotropical Mimallonidae (Lepidoptera, Mimallonoidea, Mimallonidae) with descriptions of three new species

Ryan A. St. Laurent¹, Carlos G. C. Mielke²

1 Cornell University, Comstock Hall, Department of Entomology, Ithaca, NY 14853-2601 USA **2** Caixa Postal 1206, 84.145-000 Carambeí, Paraná, Brazil

Corresponding author: Ryan A. St. Laurent (ras569@cornell.edu)

Academic editor: D. Lafontaine | Received 28 November 2015 | Accepted 11 February 2016 | Published 18 February 2016

<http://zoobank.org/FDB284D9-A17D-4532-9658-C646D6AAFE52>

Citation: St Laurent RA, Mielke CGC (2016) Three new genera of Neotropical Mimallonidae (Lepidoptera, Mimallonoidea, Mimallonidae) with descriptions of three new species. ZooKeys 566: 117–143. doi: 10.3897/zookeys.566.7344

Abstract

Three new genera of Mimallonidae are described. The monotypic genus *Tostallo* **gen. n.** is erected to contain “*Perophora*” *albescens* Jones, 1912, which was previously placed in the preoccupied genus *Perophora* Harris, 1841 and was never formally moved to a valid genus. *Perophora* is a junior homonym of *Cicinnus* Blanchard, 1852, but the name *albescens* is not appropriately placed in *Cicinnus* due to external and genitalia characteristics entirely unique to the species *albescens*. The female of *Tostallo albescens* **comb. n.** is described and both sexes are figured for the first time. *Auroriana* **gen. n.** is erected to contain *A. florianensis* (Herbin, 2012), **comb. n.** previously described as *Cicinnus florianensis*, and two new species: *A. colombiana* **sp. n.** from Colombia and *A. gemma* **sp. n.** from southeastern and southern Brazil. The female of *A. florianensis* is described and figured for the first time. Finally, the monotypic genus *Micrallo* **gen. n.** is erected to include a new species, *M. minutus* **sp. n.** described from northeastern Brazil.

Keywords

Auroriana, biodiversity, *Cicinnus*, *Micrallo*, Neotropical, taxonomy, *Tostallo*

Introduction

Schaus (1928) described 16 of the 28 currently recognized Mimallonidae genera, with only *Naniteta* Franclemont, 1973 and *Arianula* Herbin, 2012 having been described since then. Franclemont (1973) recognized strong affinities between all of the genera and speculated that the family must be recently diversified. The number of genera in Mimallonidae is high relative to the small size of the family, wherein only a little more than 200 species have been described (Becker 1996, Herbin 2012, 2015, Herbin and Mielke 2014, Herbin and Monzón 2015, St Laurent and Dombroskie 2015). Therefore, many of the genera are represented by three or fewer species (St Laurent and Dombroskie 2015), including the three new genera described here.

Currently there is no accepted subfamily arrangement for the family Mimallonidae. Schaus (1928) proposed two subfamilies based primarily on the presence/absence of the frenulum. Schaus frequently failed to recognize the presence of vestigial frenula when they were in fact present, hence his subfamily arrangement has been rejected by most contemporary authors (Pearson 1951, 1984, Franclemont 1973, Herbin 2012, St Laurent and Dombroskie 2015, but see Becker 1996 and Herbin and Monzón 2015). We continue to recognize the lack of a clear subfamily arrangement awaiting a higher-level treatment of the family.

Recent interest in the taxonomy of Mimallonidae has resulted in numerous new species (Herbin 2012, 2015, Herbin and Mielke 2014, Herbin and Monzón 2015, St Laurent and Dombroskie 2015) described over a short period of time, displaying the previous lack of work on the group. Recent efforts by Herbin (2012) and on-going investigations by the first author of the present article have resulted in new genera, three of which are described herein.

Methods

Dissections were performed as in Lafontaine (2004). Morphological, including genitalia, terminology follows Kristensen (2003). Figures were manipulated with Adobe Photoshop CS4 (Adobe 2008).

Male genitalia are figured in natural color with CS4 “auto color” used to improve white backgrounds. Most genitalia were photographed with a Macroscopic Solutions Macropod Pro and Canon EOS 6D DSLR camera body using the Macro Photo MP-E 65mm f/2.8 1–5× Manual Focus Lens for EOS except when received from other individuals or institutions. Thirty (3×) photographs were taken of each specimen in ethanol under glass, and stacked using Zerene Stacking Software.

Maps were created with SimpleMappr (Shorthouse 2010) and edited with CS4. All geographical co-ordinates are approximate, and are based on the localities provided on specimen labels. Co-ordinate data were acquired with Google Earth (2015).

Specimens from the following collections were examined:

CGCM Coll. Carlos G. C. Mielke, Curitiba, Paraná, Brazil

COM	Coll. Olaf H. H. Mielke, Curitiba, Paraná, Brazil
CPC	Coll. Philippe Collet, Caen, France
DZUP	Coll. Pe. Jesus S. Moure, Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil
MNHN	Muséum nationale d'Histoire naturelle de Paris, France
MZSP	Coll. Museu de Zoologia, Universidade de São Paulo, São Paulo, São Paulo, Brazil
BMNH	The Natural History Museum [statutorily British Museum (Natural History)], London, U.K.
RAS	Research collection of Ryan A. St. Laurent, Ithaca, New York, USA
USNM	National Museum of Natural History [formerly United States National Museum], Washington D.C., USA

Results and discussion

Tostallo St Laurent & C. Mielke, gen. n.

<http://zoobank.org/5C06B802-4FA9-4DDA-B6E6-B4D422292E0E>

Type species. *Perophora albescens* Jones, 1912.

Etymology. The genus name is derived from the toasted (*tostus* Latin) appearance of the white forewings, which is unique among Mimallonidae and reminiscent of toasted marshmallows; + the ending -llo, which is shared with *Mimallo* Hübner, [1820], the type genus of Mimallonidae. The genus name is masculine.

Diagnosis. The monotypic *Tostallo* is remarkable among Mimallonidae in that the ground color is nearly white and the forewings rounded, a combination of characters seen nowhere else in the family. Male genitalia are unique in that the gnathos is formed by two large columnar structures with multiple invaginations and internal wrinkles. Female genitalia can be recognized by the wrinkled, setae covered accessory part of segment VIII, which encircles the papillae anales, as well as by the apophyses posteriores, which are hollow, almost balloon-like lobes, rather than thin rods as in other genera.

Description. Male. *Head:* Width half that of thorax, light brown, eyes bordered posteriorly by dark-brown scales encircling head, forming dark mane; palpus not extending beyond frons, covered dorsally in darker brown scales; antenna opaque yellow, bipectinate to tip, rami increasing in length from antennal base to roughly middle of antennal length where rami length continuously decrease until terminus. *Thorax:* Pale tan brown, lighter near wing base, darker mesally, overall lightly speckled with darker petiolate scales. *Legs:* Color as for thorax, but tarsus light brown, petiolate scales present. Tibial spurs very thin, elongate, clothed in fine white scales. *Forewing dorsum:* Forewing length: 12–13 mm, avg. 12.5 mm, Wingspan: 23–26.5, n = 3. Subtriangular, outer margin convex, apex not pronounced. Ground color cream to white, overall lightly speckled by dark petiolate scales; outer margin fringed, grey. Antemedial line faint pale brown, somewhat wavy, especially

near costa. Postmedial line dark brown, waxy, convex and mostly evident from costa to Rs3. Basal and medial areas proximately concolorous with thorax; medial area distally gray reaching inner margin towards wing base. Submarginal band darker, compressed, sometimes absent between postmedial line and marginal band. The latter grayish brown, delineated by an undulating line suffused with white distally. Discal spot marked by small, tan, crescent-shaped mark. Black patch of scales at apex extends to Rs3. *Forewing ventrum*: Similar to dorsum but more yellow brown, white and gray suffusions absent, submarginal and marginal bands lighter, postmedial line continuous, submarginal and antemedial lines absent. *Hindwing dorsum*: Coloration as for forewing dorsum, but lighter. Antemedial line brown, partially visible near inner margin. Postmedial line faintly marked, bordered by white distally. Submarginal band grayish brown. Marginal band lighter. *Hindwing ventrum*: Follows same pattern as forewing ventrum but discal mark absent. Frenulum a single, relatively-thick bristle. *Venation*: Typical of Mimallonidae, very similar to *Cicinnus melsheimeri* (Harris, 1841), but forewing M_1 and M_2 originate from cell nearer to R and CuA_1 respectively, than to each other. *Abdomen*: Short, not exceeding hindwing tornus, stout, coloration as for thorax, ventrally pale. *Genitalia*: (Fig. 4) $n = 4$. Simple; tegumen reduced to slender rod. Vinculum box-like, not projected anteriorly. Uncus simple, subtriangular, truncated apically. Gnathos as two unfused, heavily-sclerotized, multiply-invaginated columnar structures with multiple internal folds. Valves short, irregularly shaped, somewhat triangular, truncated apically forming lobe, sclerotization weak mesally with heavily sclerotized fingerlike projection subapically. Juxta partially fused to phallus, separate portion of juxtal plate embedded in anellus. Phallus short, pistol shaped; flattened, open dorsally; base of phallus with short, anteriorly-curved lobe, vesica small, somewhat bag-like.

Female. *Head*: As for male. *Thorax*: As for male. *Legs*: As for male, but tibial spurs slightly longer. *Forewing dorsum*: Forewing length: 14–16.5 mm, avg. 15.25 mm, Wingspan: 26–35 mm, $n = 2$. As for male but slightly longer, black patch of scales at forewing apex extended to Rs4 rather than Rs3. *Forewing ventrum*: Similar to dorsum but yellower brown. Antemedial line absent. Postmedial line continuous, submarginal band lighter. *Hindwing dorsum*: As for male but somewhat broader. *Hindwing ventrum*: Follows same pattern as forewing ventrum but discal mark absent. Frenulum apparently absent or highly reduced. *Abdomen*: As in male but more robust, sclerotized bands present ventrally on segment VIII. *Genitalia*: (Figs 5, 6) $n = 2$. Papillae anales setose, somewhat flattened ventrally, covered in short denticles from which very short setae originate. Apophyses anteriores very short, robust, flattened; apophyses posteriores as hollow, rounded, balloon-like lobes. Ductus bursae relatively long, corpus bursae bag-like with slight sclerotization terminally. Dorsal sclerotization of tergite VIII thin, folded inward, arc-like, with asymmetrical ridges on lateral sides of central arc. VIII encircles genitalia as thick, moderately sclerotized, setae covered, finely wrinkled structure, invaginated around entire circumference. Ostium unsclerotized. Lamella antevaginalis reduced, subtriangular, small notch apically.

Remarks. *Perophora albescens* Jones, 1912 was described in the preoccupied genus *Perophora* Harris, 1841 (*Perophora* Wiegmann, 1835 [Tunicata]) despite the fact that another name, *Ptochopsyche* Grote, 1896, was proposed as a replacement well before Jones's description. Both *Perophora* and *Ptochopsyche* are currently treated as synonyms of *Cicinnus* Blanchard, 1852 (Becker 1996). However, *T. albescens* comb. n. lacks the external and genital characters that are "characteristic" of the poorly defined genus *Cicinnus* (sensu Franclemont 1973, Herbin 2012, 2015, Herbin and Mielke 2014, Herbin and Monzón 2015), namely in that the forewings are not falcate and the valves of the male genitalia are simple rather than variously reduced as in *C. melsheimeri*, the type species of both *Perophora* and *Ptochopsyche*. Thus it is not appropriate to merely consider *albescens* within *Cicinnus*.

Schaus (1928), the last to completely revise the family, was unable to "identify" "*Perophora albescens*" and only re-iterated Jones's description without assigning the species to a valid genus. Additionally, Becker (1996) did not list this species. Further compounding the ambiguity of the taxon *albescens*, neither sex of this species has been previously figured. While the validity of the species has never been questioned, Schaus's inability to locate the holotype likely has led to this taxon being ignored or overlooked in all subsequent literature. Given the opportunity to re-examine Jones's original specimens, including the holotype, and perform comparisons to all known Mimallonidae genera, it is readily apparent that *T. albescens* comb. n. is unique among Mimallonidae and should be transferred to a new, monotypic genus. We therefore make this long overdue change in the present work, moving the name *albescens* from the preoccupied *Perophora* to a new genus, to solidify its uniqueness in the family. We provide figures of the holotype male, an additional male and female, as well as the genitalia of both sexes to allow for better recognition of this rarely reported enigmatic species.

***Tostallo albescens* (Jones, 1912), comb. n.**

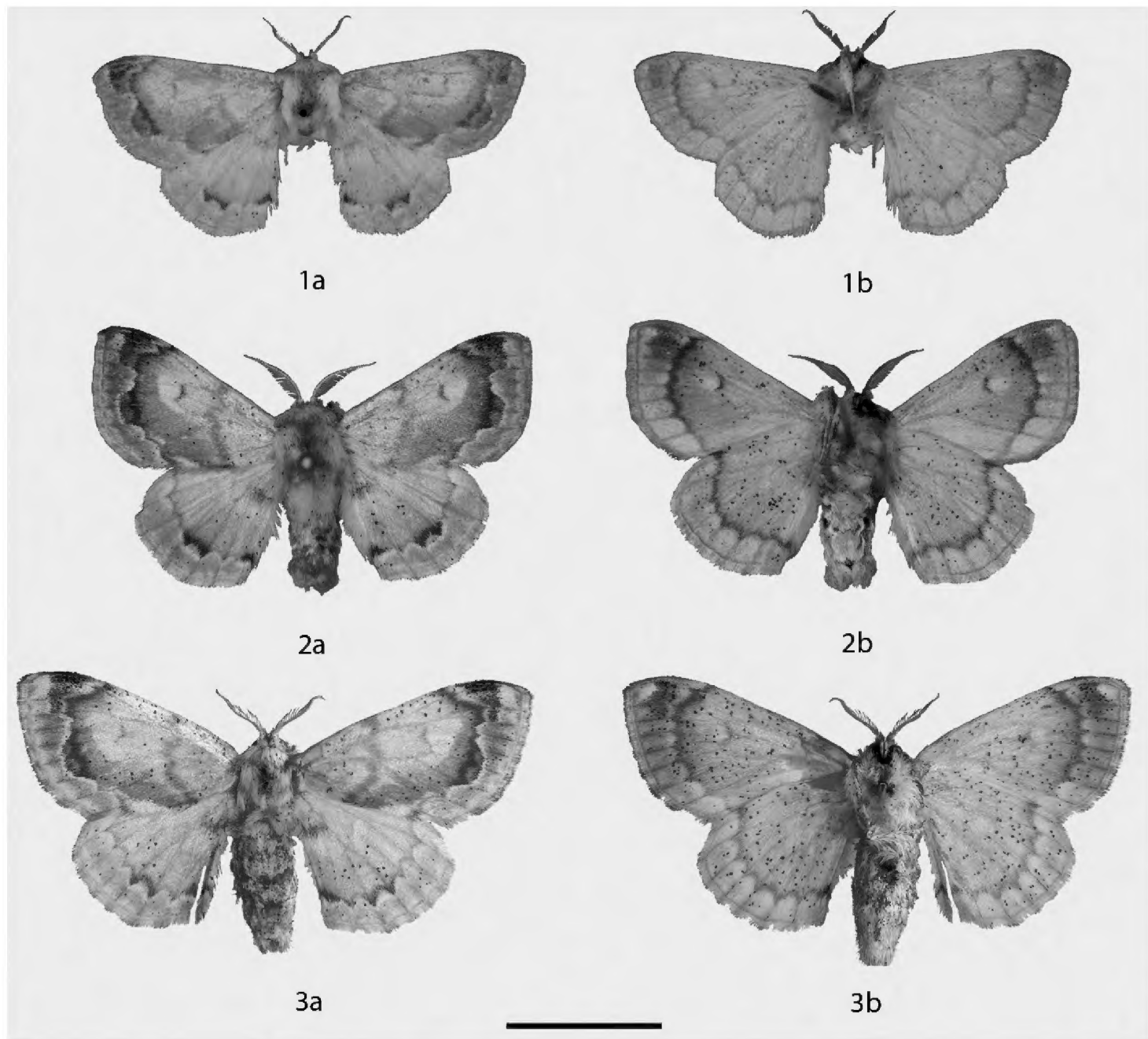
Figs 1–7

Perophora albescens Jones, 1912: 435

Perophora albescens Jones; Schaus 1928: 671–672

Type material. Holotype, ♂: S. Paulo, S. E. Brazil./ *Perophora albescens*, Type ♂ .D. Jones/ E. D. Jones Coll., Brit. Mus. 1919–295/ BMNH(E) #805419/ Mimallonidae BMNH(E) Slide #001/ (BMNH, examined). Type locality: Brazil: São Paulo.

Additional specimens examined. (5 ♂, 2 ♀) **ARGENTINA: Misiones:** 1 ♂, Posadas: 26.IX.1921, BMNH(E) 1378118, St. Laurent diss.: 10-21-15:5 (BMNH). **BRAZIL: Paraná:** 1 ♂, 1 ♀, Tirol das Torres, Uberaba, Curitiba, 900 m: 2.III.2000, 2.I.2001, O. Mielke leg., C. Mielke diss.: 51.381, 53.261 (COM 51.381, 53.261). **Rio Grande do Sul:** 1 ♀, illegible collector and date: Joicey Coll. Brit. Mus. 1925–157, BMNH(E) 1378120, St. Laurent diss.: 10-21-15:6 (BMNH). **São Paulo:** 1 ♂, Guapiara, Paivinha, 800 m: 16–19.IX.2005, C. Mielke leg., (CGCM 28.855). 1 ♂, Alto da Serra: IX.1935, Coll. R. Spitz, Brit. Mus-112(?), BMNH(E) 1378119, St.



Figures 1–3. *Tostallo albescens* adults, **a** recto, **b** verso. **1** Holotype ♂, Brazil, São Paulo (BMNH) **2** ♂, Brazil, São Paulo, Guapiara, Paivinha, 800 m (CGCM) **3** ♀, Brazil, Rio Grande do Sul (BMNH). Scale bar = 1 cm.

Laurent diss.: 10-21-15:4 (BMNH). 1 ♂, “S.E. São Paulo, 750 m”: E.D. Jones, E.D. Jones Coll. Brit. Mus. 1919–295, BMNH(E) 1378117 (BMNH).

Diagnosis. See genus diagnosis.

Description. See genus description.

Distribution (Fig. 7). *Tostallo albescens* primarily inhabits the Brazilian Atlantic Forest in the states of São Paulo and Paraná. A single record from Rio Grande do Sul lacks more specific data, thus we are unable to determine if this record comes from the Atlantic Forest region in the northeastern part of the state or from elsewhere. A single record from Misiones, Argentina, suggests that this species is more widespread in the inland ecoregions of the Atlantic Forest biome.

Remarks. As mentioned in the genus remarks above, this species is unique among Mimallonidae, namely because of the white ground color and rounded forewings. This species is poorly represented in collections.

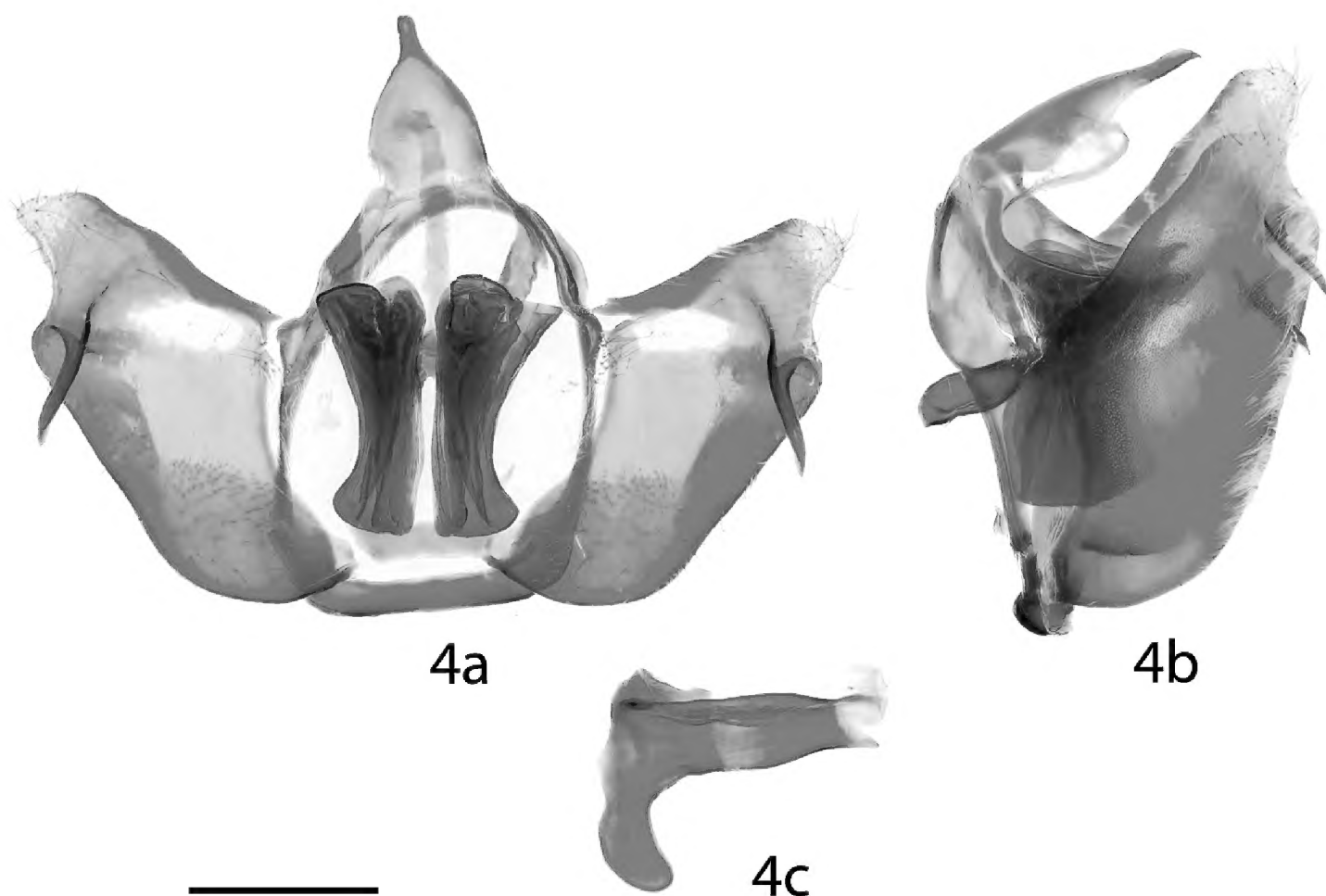


Figure 4. *Tostallo albescens* male genitalia, **a** ventral, **b** lateral, **c** phallus. Brazil, São Paulo, Alto da Serra [St. Laurent diss.: 10-21-15:4] (BMNH). Scale bar = 1 mm.

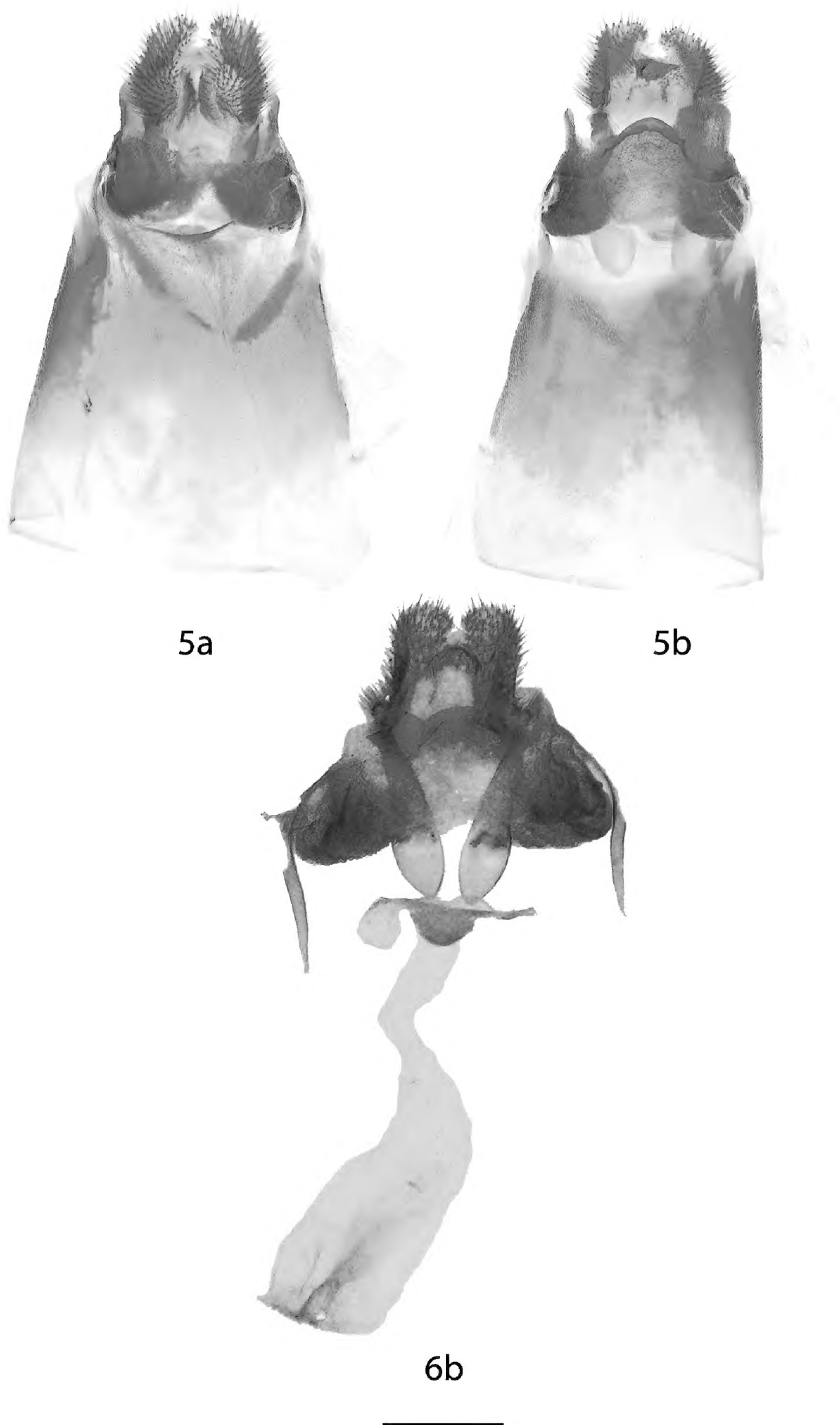
***Auroriana* St Laurent & C. Mielke, gen. n.**

<http://zoobank.org/31C8B6C2-3B3D-4CF4-94EB-BBC312041FDF>

Type species. *Auroriana colombiana* St Laurent & C. Mielke, sp. n.

Etymology. This genus is named for the sunrise (*aurora* Latin) because of the pink and orange coloration of all species in the genus. These colors are reminiscent of the light scattering phenomenon of the rising sun. The genus name is feminine.

Diagnosis. *Auroriana* can be distinguished from all currently described Mimalonidae by the orange and diffuse pink coloration on all wings, and by the pink and beige head and thorax. Male genitalia are unique in the combination of the following characters: variably-shaped, heavily-sclerotized, unfused gnathos processes, relatively-simple valves, and downward-curved phallus with a distinct lobe-like process at the base. Only a few other similarly-sized, orange and pink Mimallonidae species are known: *Druentica fatella* (Schaus, 1905), *Trogoptera semililacea* (Dognin, 1916), and the species of *Reinmara* Schaus, 1928. These species, while superficially similar to *Auroriana*, can be easily differentiated by the straight forewing postmedial line and by the stark contrast between the completely or nearly completely pink medial region and the orange postmedial region rather than the much more diffuse pink coloration in *Auroriana*. Additionally, the dark brown wing fringes accent the notch at the tornus of both *D. fatella* and *T. semilacea*, a character not seen in *Auroriana*. *Druentica fatella* has



Figures 5, 6. *Tostallo albescens* female genitalia, **a** ventral, **b** dorsal. **5** Brazil, Rio Grande do Sul [St. Laurent diss.: 10-21-15:6] (BMNH) **6** Brazil, Paraná, Curitiba [C. Mielke diss.: 51.381] (COM). Scale bar = 1 mm.

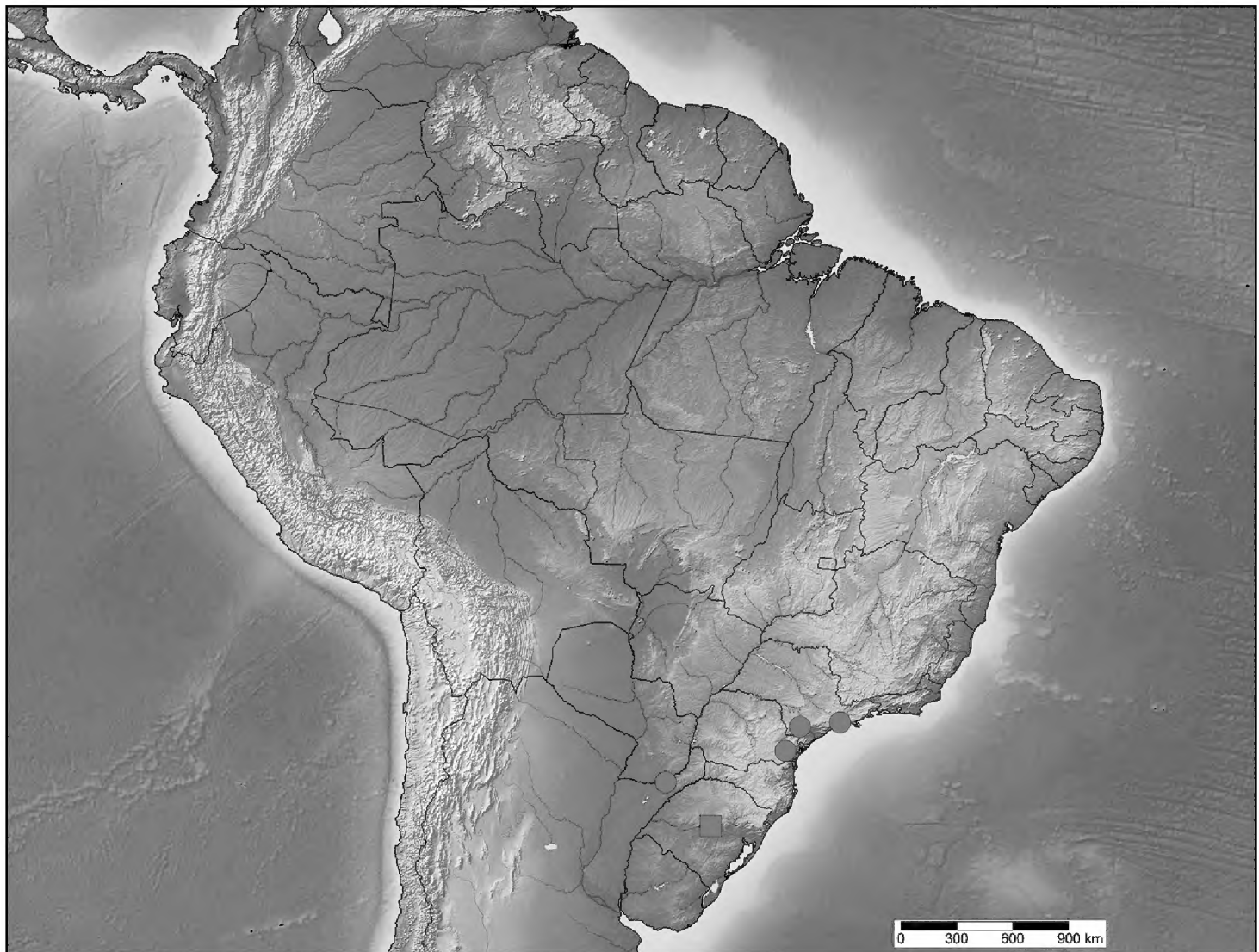


Figure 7. Distribution of *Tostallo albescens*. The square represents a generalized (center of the state) locality for Rio Grande do Sul, a state for which detailed locality data is lacking.

a characteristic dark tuft of scales at the terminus of the abdomen, which is absent in *Auroriana*. Furthermore, the genitalia of these species are entirely distinct from those of *Auroriana*, where all major characters pertinent to the diagnosis of *Auroriana* are absent. Interestingly, the present study reveals that *D. fatella* likely does not belong to its present genus due to a combination of external and genitalia characters unlike what is seen in other species of *Druentica*.

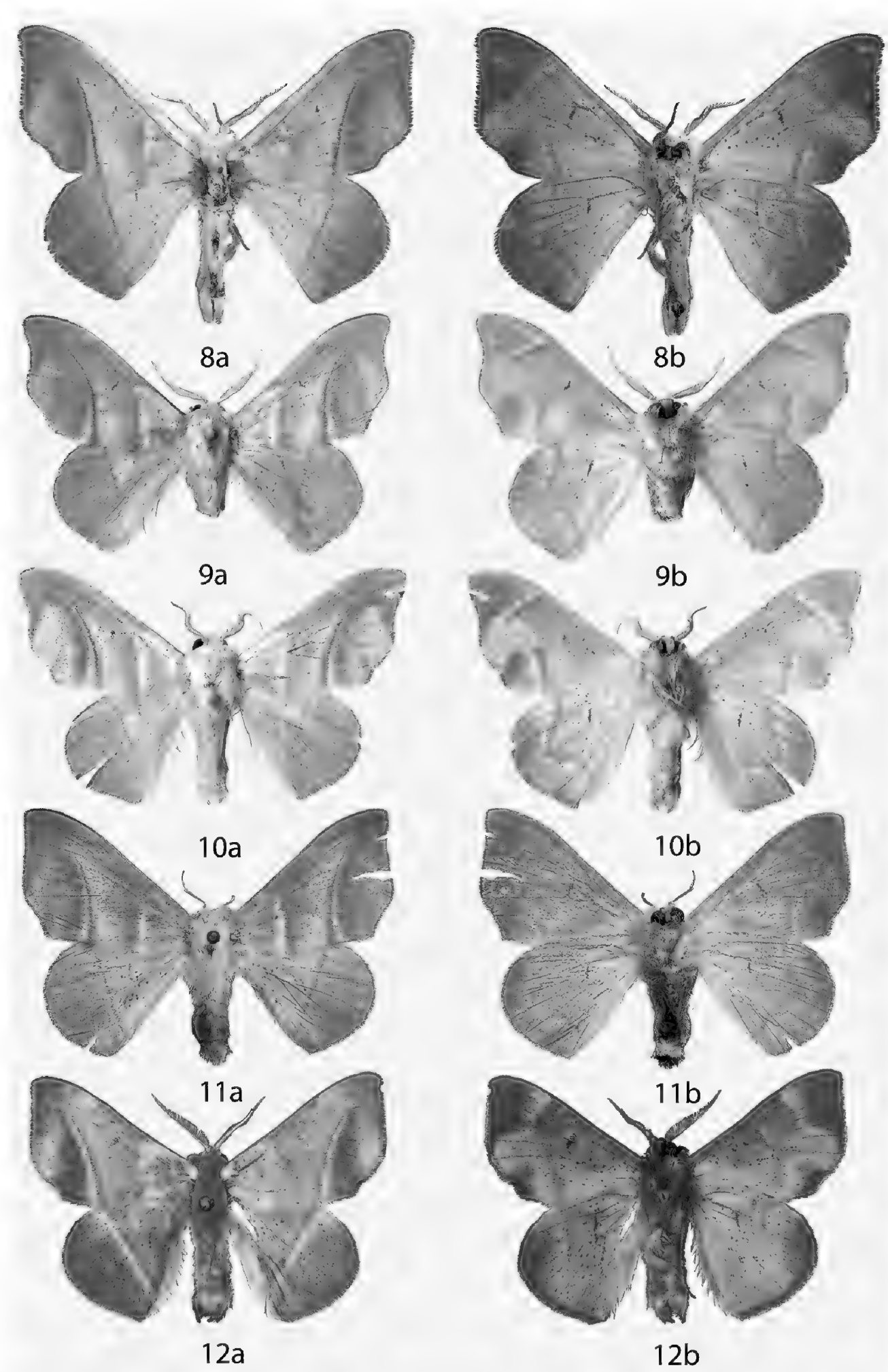
Description. Male. Head: Width roughly two thirds that of thorax, pinkish; labial palpus not extending beyond frons, pink; antenna bipectinate to terminus; rami increasing in length from antennal base to roughly one fifth of antennal length where rami length is nearly constant for following fifth of antennal length after which rami continuously decrease in length until terminus. **Thorax:** Pink and beige, thickly covered in long scales, darker petiolate scales absent. **Legs:** Light pink, vestiture long, tarsus usually tan, tibial spurs similar to those of *Eadmuna* Schaus, 1928. **Forewing dorsum:** Forewing length: 16–21 mm. Somewhat triangular, slight inward notch at tornus, margin convex mesally. Ground color light orange brown, overall very sparsely speckled by dark petiolate scales. Antemedial line faint pink, nearly straight or bowed slightly. Postmedial line slightly or moderately bowed inward, dark brown, outward edge lined with very pale pink band of varying width, postmedial line angled sharply to-

wards costa after passing Rs₄. Discal spot a small black mark. Antemedial area usually more solid pink than diffusely shaded medial area. Sub- and marginal areas darker than medial area. *Forewing ventrum*: As for forewing dorsum but antemedial and postmedial lines faint or absent; pink suffuse line near apical quarter extending from costa to postmedial suffusion. *Hindwing dorsum*: Coloration as for forewing dorsum, but less pink, postmedial line may lack outer pink edging. *Hindwing ventrum*: As in for forewing ventrum but postmedial line better developed, lobed outward mesally. Frenulum a single bristle. *Venation*: Typical of Mimallonidae, very similar to *C. melsheimeri* but CuA₁ bent more posteriorly. *Abdomen*: Short, not extending beyond hindwing tornus, stout, coloration as for thorax but with more beige than pink. *Genitalia*: Somewhat complex; tegumen very broad to narrow, subtriangular, or more rectangular. Vinculum ovoid or irregularly shaped, lobes present mesally below gnathos, or when not present, elongated, trumpet-like structures present at base of valves instead; uncus tubular or triangular, in most species hardly differentiated from tegumen; gnathos as two unfused heavily-sclerotized processes, either roughly triangular or two-pronged. Valves triangular, with triangular or rounded saccular edge lobe, valve with mesal tooth present in one species; saccular edge of valve with longer, heavier setae in Amazonian species. Juxta fused to phallus, with elongate ventral process connecting phallus at base of valves. Phallus variable in length, but always curved downward; basally with ventrally angled elongation, terminus with hook-like process or simple. **Female.** *Head*: As for male, but antennal rami shorter. *Thorax*: As for male, but with more beige scales. *Legs*: As for male. *Forewing dorsum*: Forewing length: 17 mm. As for male, but broader, pink suffusions reduced, ground color more olive green than orange. *Forewing ventrum*: As for forewing dorsum but pinkish suffusions nearly absent, postmedial line absent, discal mark more pronounced. *Hindwing dorsum*: As for male but slightly broader, dark petiolate scales more numerous, especially antemedially. *Hindwing ventrum*: Following same pattern as forewing ventrum. *Abdomen*: As for male, but broader. Sternite VIII with pair of short sclerotized bands posteriorly. *Genitalia*: Papillae anales broad, somewhat rectangular, covered in setae, increasing in length at base. Apophyses anteriores with curved tips; apophyses posteriores robust, wide, slightly longer and broader than apophyses anteriores. Ductus bursae very long, somewhat sclerotized near ostium, ductus not differentiated from long, narrow corpus bursae. Dorsal sclerotization of tergite VIII as narrow band with posteriorly directed mesal arc with membranous center. Lamella antevaginalis very large, broad, trapezoidal, notched mesally.

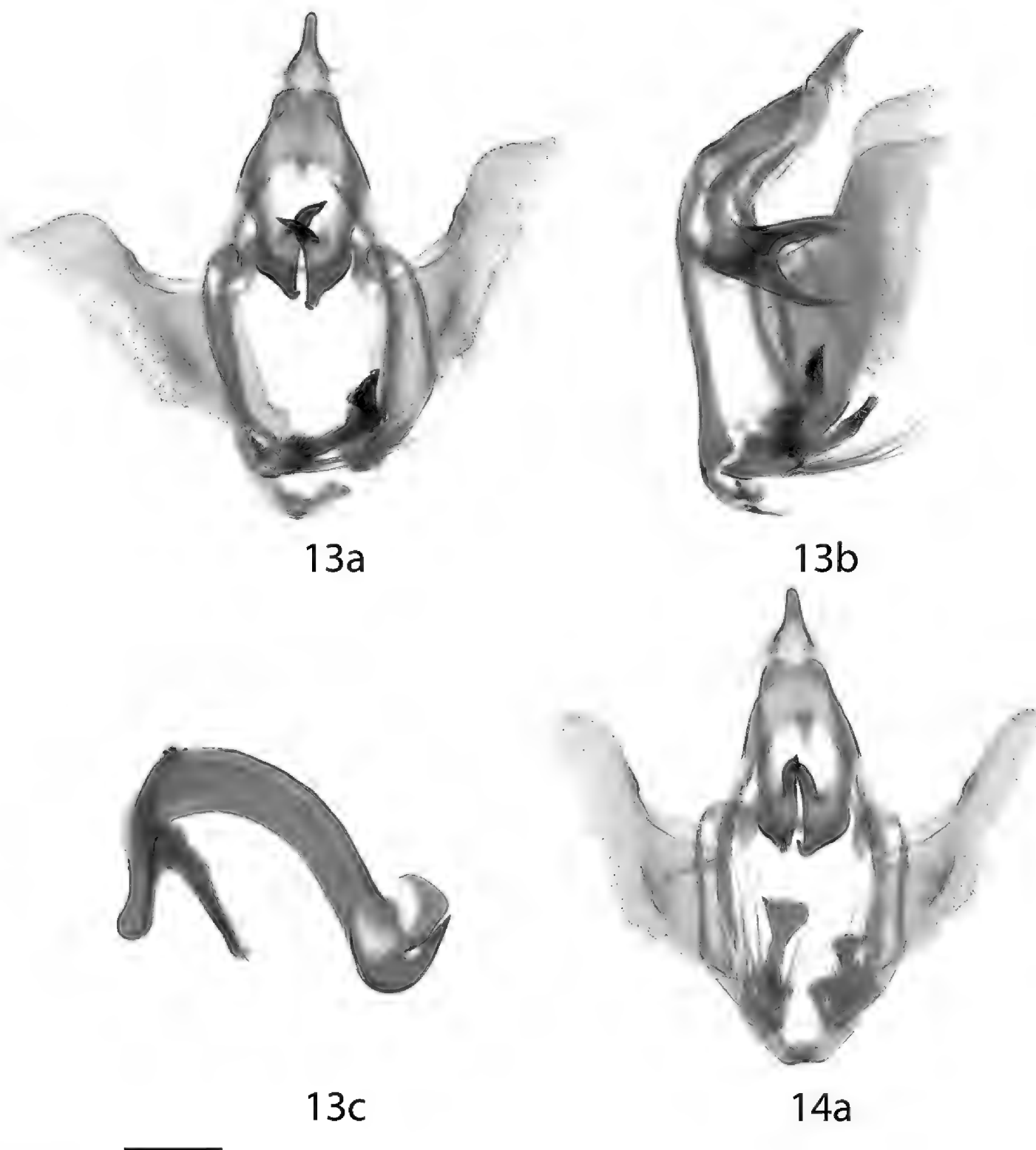
Remarks. This new genus is erected to include three South American species. All three species are known from very few specimens, being poorly represented in collections. Herbin (2012) was the first to recognize the uniqueness of *A. florianensis* at the time of its original description, but did not describe a new genus in which to place it. Upon the discovery of two additional species similar to *A. florianensis*, the first author determined that external morphology and male genital characteristics united these three species and set them apart from all other described Mimallonidae genera. We hereby describe a new genus in which to place the previously described *A. florianensis* and the two new species described below.

1	Forewing postmedial line nearly straight (Figs 8, 12)	2
–	Forewing postmedial line bowed inward toward thorax (Figs 9–11)	<i>A. florianensis</i>
2	Hindwing postmedial line thin, well defined, pale diffuse outer band absent..	<i>A. colombiana</i>
–	Hindwing postmedial line as pale, pink, diffuse band	<i>A. gemma</i>

Description. Male. *Head:* Light pink, eyes bordered posteriorly by black scales; antenna opaque yellow; labial palpus small, dorsally with darker scales. *Thorax:* Pink, interspersed with beige scales. *Legs:* Light pink, vestiture long, tarsus pale brown, tarsal spurs relatively long, clothed in pink scales except naked, finely-pointed apical tip. *Forewing dorsum:* Forewing length: 20–21 mm, avg. 20.5 mm, Wingspan: 36–38 mm, avg. 37 mm, n = 2. Triangular, slight inward notch at tornus, margin convex mesally. Ground color light orange brown, medial region very sparsely speckled by dark petiolate scales. Antemedial line diffuse, faint pink, nearly straight. Postmedial line bowed inward slightly, dark brown, outward edge finely lined with pale pink, especially near tornus, postmedial line angled sharply towards costa after passing Rs4. Antemedial area pink. Postmedial area darker brown orange with pale



Figures 8–12. *Auroriana* adults, **a** recto, **b** verso. **8** *A. colombiana* holotype ♂, Colombia, Meta, Río Negro, 800 m (BMNH) **9** *A. florianensis* holotype ♂, French Guiana, Piste du Dégrad Florian, PK 12 [photo courtesy of MNHN] (MNHN) **10** *A. florianensis* ♂, French Guiana, St. Jean du Maroni, Plateau des Mines, PK 1.3 [photo courtesy of MNHN] (MNHN) **11** *A. florianensis* ♀, French Guiana, Réserve des Nouragues, Inselberg [photo courtesy of CPC] (MNHN) **12** *A. gemma* holotype ♂, Brazil, Santa Catarina, São Bento do Sul, Rio Natal, 550 m (DZUP). Scale bar = 1 cm.



Figures 13, 14. *Auroriana colombiana* male genitalia, **a** ventral, **b** lateral, **c** phallus. **13** Holotype, Colombia, Meta, Río Negro, 800 m [St. Laurent diss.: 11-3-15:1] (BMNH) **14** Paratype, Colombia, Meta, Río Negro, 800 m [St. Laurent diss.: 10-21-15:3] (BMNH). Scale bar = 1 mm.

pink-gray suffusion near wing margin, medial area lighter orange with pink suffusion, especially along postmedial line. Discal spot a small black, elongated mark. *Forewing ventrum*: Similar to dorsum but postmedial line very faint; antemedial line absent; deeper orange overall with reduced pink suffusion. *Hindwing dorsum*: Coloration as for forewing dorsum; well-defined postmedial line lacks outer pink edging. *Hindwing ventrum*: Follows same pattern as forewing ventrum but pinker, lighter overall. *Abdomen*: As for genus, coloration as for thorax, but less pink. *Genitalia*: (Figs 13, 14) $n = 2$. Tegumen narrow, rectangular. Vinculum ovoid with small pointed projection ventrally between saccular bases of valves. Uncus small, triangular. Gnathos as two

unfused heavily-sclerotized, two-pronged processes. Valves simple, bent upward, sacculus edge with mesal lobe, base of valve with elongated, trumpet-shaped processes, process of left valve longer than that of right; base of valves with long, thick deciduous setae. Juxta fused to phallus, with elongate, flattened ventral process connecting phallus-juxta complex to base of valves. Phallus very elongated, curved, downturned, terminus with hook-like backwardly-angled process, base of phallus with elongated lobe. **Female.** Unknown.

Distribution (Fig. 19). *Auroriana colombiana* is so far known only from the type locality in central Colombia.

Etymology. This species is named for Colombia, as it is the only species in the genus known from this country.

Remarks. Although this species resembles *A. florianensis*, the striking genital differences clearly differentiate the two. *Auroriana florianensis* and *A. colombiana* seem to represent an Amazonian lineage of *Auroriana*, unified by the presence of heavier setae on the sacculus basal edge of the valves and by the relatively large, elongate phallus, characters that are not present in *A. gemma* sp. n. described below.

***Auroriana florianensis* (Herbin, 2012), comb. n.**

Figs 9–11, 15, 17–19

Cicinnus florianensis Herbin, 2012: 23–25, figs 17, 18.

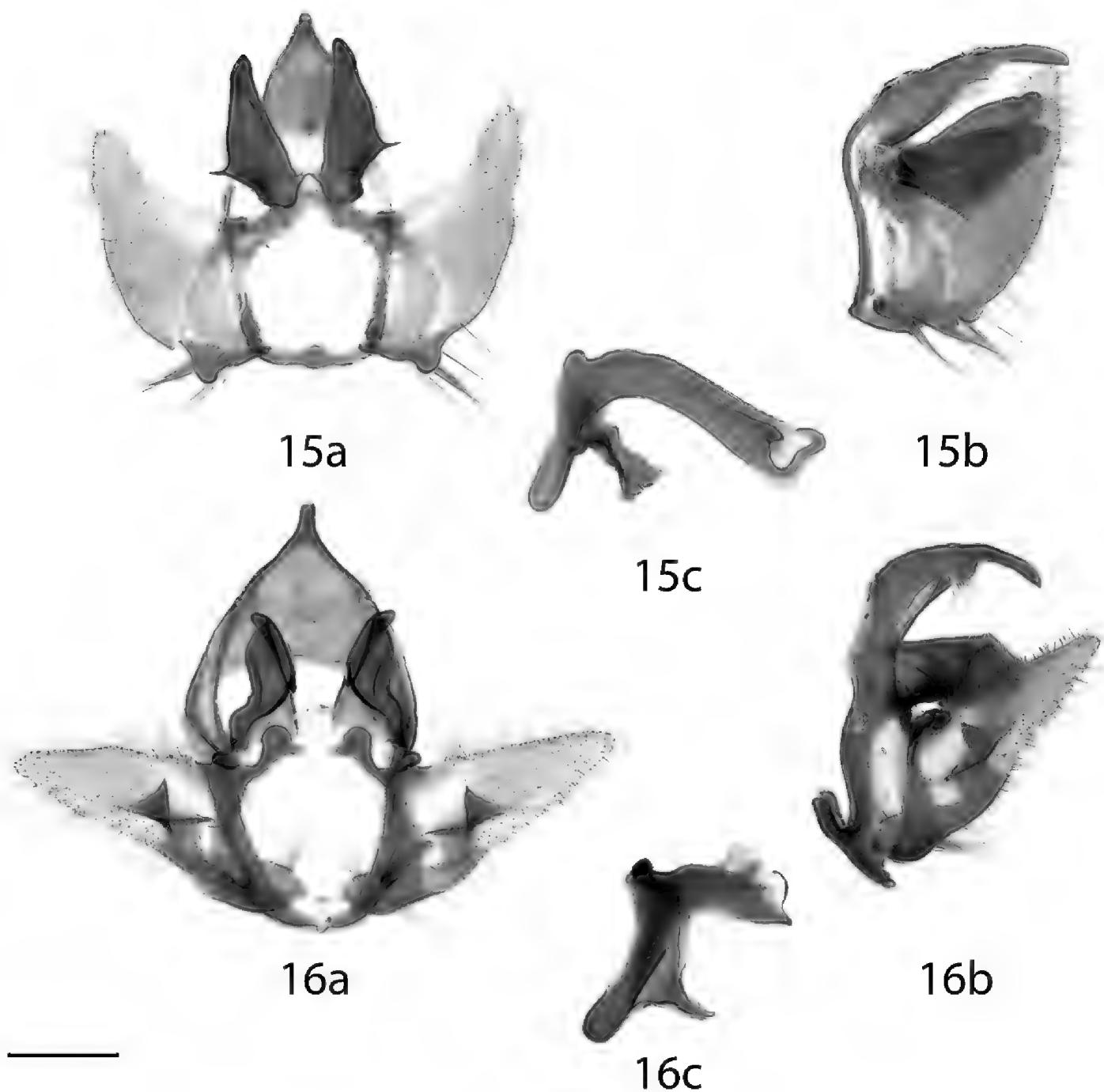
Type material. Holotype, ♂: 29-VII-2001, Piste du Dégrad Florian, PK 12, GUYANE Fcse, Coll. M. LAGUERRE, M. Laguerre leg./ genitalia, prep. D. Herbin, H. 674/ BC-Her1657/ *Cicinnus florianensis*, Herbin, 2012, The European entomologist, Vol. 4, N° 1, Holotype ♂/ (MNHN, examined). Type locality: French Guiana: Piste du Dégrad Florian, PK 12.

Additional specimens examined. (4 ♂, 1 ♀) **FRENCH GUIANA:** 1 ♂, St. Jean du Maroni, Plateau des Mines, PK 1,3: 29.VII.1993, L. Sèneaux réc. (MNHN). 1 ♂, Mont Mitaraka [Massif du Mitaraka], 300 m: 19.VIII.2015, La Planète revisitée, MNHN/PNI, APA 973-I, Ph. Collet leg., at mercury vapor light, St. Laurent diss.: 11-19-15:1 (RAS). 1 ♂, Saül, Point de vue: 30.VII.2011, Eddy Poirier leg., at UV light (CPC). 1 ♂, Réserve des Nouragues, Inselberg: 5.VIII.2010, Ph. Collet leg., at UV light (CPC). 1 ♀, Réserve des Nouragues, Inselberg, 4° 5'15" N, 52° 40'48" W, 110 m: 8.VIII.2010, at UV light, Eddy Poirier leg., Chr. Gibeaux diss. prep: 7759 (MNHN).

Diagnosis. *Auroriana florianensis* is similar to the previous species; see the diagnosis of *A. colombiana* for differentiating characters between both species. *Auroriana florianensis* can be distinguished from *A. gemma* sp. n. by the more strongly curved forewing postmedial line, straighter forewing antemedial line, and by the more expansive pink suffusion in the postmedial region. The genitalia can also be used to differentiate the two: in *A. florianensis* the tegumen is narrower, the gnathos processes larger, with

a sharp tooth basally, and the valves are bent upward, with heavier setae on the basal saccular edge. *Auroriana florianensis* lacks the mesal valve tooth present in *A. gemma* sp. n. Finally, the phallus of *A. florianensis* is much longer than in *A. gemma* sp. n.

Description. Male. *Head:* Pink, eyes bordered posteriorly by dark-brown scales; antenna opaque yellow; labial palpus small, dorsally with darker scales. *Thorax:* Pink, interspersed with beige scales, prothorax darker pink. *Legs:* Light pink, vestiture long, tarsus beige, tarsal spurs relatively long, finely pointed apical tips. *Forewing dorsum:* Forewing length: 17 mm, avg. 17 mm, n = 3, Wingspan: 32 mm. Triangular, slight inward notch at tornus, margin convex mesally. Ground color light orange brown, overall very sparsely speckled by dark petiolate scales. Antemedial line faint pink, nearly straight. Postmedial line bowed inward, dark brown, outward edge lined with pale pink, especially approaching tornus, postmedial line angled sharply towards costa immediately after passing Rs4. Antemedial area pink. Medial area lighter orange with pink suffusion. Submarginal area darker brown, marginal area with variably sized pink-gray suffusion. Discal spot a small black mark. *Forewing ventrum:* Similar to dorsum but ante- and postmedial lines absent, pink suffusion reduced antemedially and medially, discal mark more visible. *Hindwing dorsum:* Coloration as for forewing dorsum, but less pink; postmedial line lacks outer pink edging. *Hindwing ventrum:* Follows same pattern as forewing ventrum, but postmedial line diffuse, brown, outwardly lobed mesally. *Abdomen:* As for genus but coloration more beige than pink. *Genitalia:* (Fig. 15) n = 1. Tegumen broad, subtriangular. Vinculum somewhat rectangular. Uncus moderate length, tubular, hardly differentiated from tegumen. Gnathos as two unfused, heavily-sclerotized, somewhat triangular processes with sharp basal tooth. Simple triangular valves bent upward, narrowed distally. Base of valves with heavier, differentiated setae, heavily sclerotized lobes. Juxta fused to phallus, with wide ventral process connecting phallus to base of vinculum. Phallus elongated, curved, downturned, terminus with weak hook-like curl and heavily sclerotized forward pointing process. Base of phallus with elongated lobe. Vesica thick, bag-like. **Female.** *Head:* As for male, but antennal rami shorter. *Thorax:* As for male, but with more beige scales. *Legs:* As for male. *Forewing dorsum:* Forewing length: 17 mm, Wingspan: ~33.5 mm, n = 1. As for male, but broader, pink suffusions reduced, ground color more olive green than orange [possible artifact of photography]. *Forewing ventrum:* As for forewing dorsum but pinkish suffusions nearly absent, postmedial line absent, discal mark more pronounced. *Hindwing dorsum:* As for male but slightly broader, dark petiolate scales more numerous, especially antemedially. *Hindwing ventrum:* Following same pattern as forewing ventrum. *Abdomen:* As for male, but slightly broader. Sternite VIII with pair of short sclerotized bands posteriorly. *Genitalia:* (Figs 17, 18), n = 1. Papillae anales broad, somewhat rectangular, covered in setae, longer anteriorly. Apophyses anteriores with curved tips; apophyses posteriores robust, wide, slightly longer and broader than apophyses anteriores. Ductus bursae very long, somewhat sclerotized near ostium, ductus not differentiated from long, narrow corpus bursae. Appendix bursae present, elongate, fingerlike. Tergite VIII as narrow band with posteriorly directed mesal arc with membranous center. Lamella antevaginalis very large, broad, trapezoidal, notched mesally.



Figures 15, 16. *Auroriana* male genitalia, **a** ventral, **b** lateral, **c** phallus. **15** *A. florianensis*, French Guiana, Massif du Mitaraka, 300 m [St. Laurent diss.: 11-19-15:1] (RAS) **16** *A. gemma* holotype, Brazil, Santa Catarina, São Bento do Sul, Rio Natal, 550 m [C. Mielke diss.: 27.473] (DZUP). Scale bar = 1 mm.

Distribution (Fig. 19). *Auroriana florianensis* is so far known only from French Guiana, but is widely distributed in the region.

Remarks. At the time of its original description, *A. florianensis* was first suggested by Herbin (2012) to be unique among Mimallonidae and possibly belonging to a new genus. Despite this opinion, with which we agree, Herbin placed this species in the “catch-all” genus *Cicinnus*, which is currently being used to subsume many newly described taxa that show no obvious generic associations (Herbin 2012, 2015, Herbin and Mielke 2014, Herbin and Monzón 2015).

After reading the description of *Cicinnus florianensis*, the first author recognized that two undescribed species under study were congeneric with *C. florianensis*, but none of them belonged in *Cicinnus*. We further support Herbin’s (2012) original as-



Figure 17. *Auroriana florianensis* female genitalia. French Guiana, Réserve des Nouragues, Inselberg, 110 m [C. Gibeaux diss. prep: 7759] (MNHN). Photo courtesy of C. Gibeaux. Scale bar = 1 mm.

sertion that *C. florianensis* belonged to a new genus. This realization was solidified when genitalia dissections revealed that the characters previously thought wholly unique to *A. florianensis* were indeed shared with both *A. gemma* sp. n. and *A. colombiana*, and with no other described Mimallonidae.

Until now, *A. florianensis* was only known from the holotype male. The female and its genitalia are figured for the first time. Additional distributional and temporal data are presented for this species.

The apparent rarity of *A. florianensis* is noteworthy, especially considering that this species is known from only five males and one female, despite intensive collecting ef-

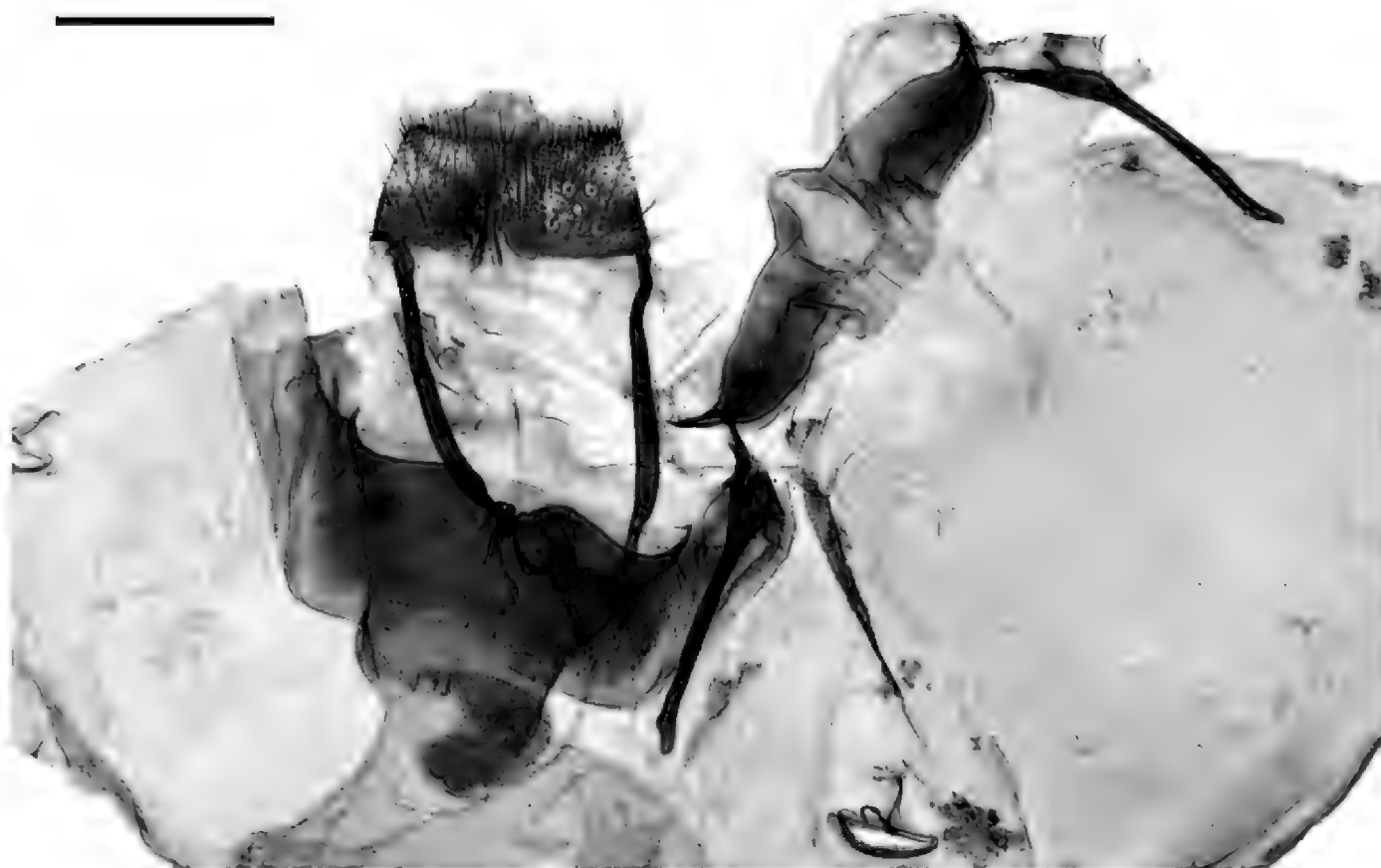


Figure 18. *Auroriana florianensis* female genitalia, detail. As for Figure 17. Scale bar = 1 mm.

forts in French Guiana. All specimens were collected in the dry season, the last days of July until late August, displaying a rather restricted flight period of less than a month. However, there are less collecting efforts during the dry season (C. G. Mielke pers. obs.), thus it is not possible to determine if the few records are due to this season being poorly collected or true rarity of the species.

***Auroriana gemma* St Laurent & C. Mielke, sp. n.**

<http://zoobank.org/CFB7093A-C529-439F-867C-3756B16ACB46>

Figs 12, 16, 19

Type material. Holotype, ♂: BRAZIL – SC [Santa Catarina], São Bento do Sul, Rio Natal, 550 m. XI.2013. A. Rank leg/ 27.473 Col. C. Mielke / C. Mielke diss.: 27.473/ DZ 32.729/ HOLOTYPE male *Auroriana gemma* St Laurent and C. Mielke, 2016 [handwritten red label]/ (DZUP). Type locality: Brazil: Santa Catarina: São Bento do Sul, Rio Natal.

Paratype, 1 ♂: **BRAZIL: Santa Catarina:** Neu Bremen [Dalbérgia]: III.1938, B. Pohl (MZSP). Paratype with the following yellow label: PARATYPE male *Auroriana gemma* St Laurent and C. Mielke, 2016.

Diagnosis. *Auroriana gemma* can be easily distinguished from its two congeners by the reduction of the pinkish suffusion postmedially and by the lighter medial and darker postmedial regions. Additionally, the forewing postmedial line is outwardly lined with a thicker pale-pink band than in other species in the genus. The hindwing

postmedial line in *A. gemma* is diffuse rather than thin and dark as in the other two species. The male genitalia also readily differentiate this species from the others. In *A. gemma* the tegumen is broader, gnathos processes shorter, somewhat wrinkled, and without a sharp tooth proximally. Additionally, the valves bear a unique, distinct, triangular mesal tooth and lack differentiated setae at the base of the valves. Finally, the phallus of *A. gemma* is much shorter than in either of the other *Auroriana* species.

Description. Male. *Head*: Light pink, eyes bordered posteriorly by dark scales; antenna opaque yellow. *Thorax*: Light tan brown, interspersed with pink scales, especially near wing base, prothorax pink. *Legs*: Light pink, but tarsus light brown. *Forewing dorsum*: Forewing length: 16 mm, avg. 16 mm, Wingspan: 30 mm, n = 2. Short, triangular, inward notch at tornus reduced, margin convex mesally. Ground color amber, orange brown, overall lightly speckled by dark petiolate scales. Antemedial line very faint pink. Postmedial line slightly curved, gray, outward edge lined with very pale pink, postmedial line angled sharply towards costa immediately after passing Rs₄, becoming diffuse pink suffusion. Antemedial area pink. Medial area lighter orange with pink suffusion. Postmedial area darker brown with pale pink-gray suffusion near wing margin; medial area lighter orange with pink suffusion; antemedial area pink. Discal spot a small dark-gray line across width of discal cell. *Forewing ventrum*: Similar to dorsum but with more speckling; ante- and postmedial lines absent; deeper orange overall with more expansive, defined pink suffusion postmedially. *Hindwing dorsum*: Coloration as for forewing dorsum, but less pink; postmedial line only as pale pink suffusion. *Hindwing ventrum*: Follows same pattern as forewing ventrum but more pink overall, orange coloration restricted to marginal region. *Abdomen*: As for genus, coloration as for thorax but more golden beige dorsally, pinker ventrally. *Genitalia*: (Fig. 16) n = 2. Tegumen broad, subtriangular. Vinculum irregular with paired, anterior process, rounded lobes present mesally below gnathos. Uncus short, tubular, hardly differentiated from tegumen. Gnathos as two unfused, heavily sclerotized, wrinkled, somewhat triangular processes. Triangular valves small relative to tegumen, simple, with sharp triangular mesal tooth. Juxta fused to phallus, with acute, pointed process. Phallus very short, simple, downturned, pointed with thin, sclerotized accessory extension terminally. Vesica short, bag-like, bulbous ejaculatoris twice length of phallus, bag-like. **Female.** Unknown.

Distribution (Fig. 19). *Auroriana gemma* is known from only two specimens: one at the type locality at 550 m in northeastern Santa Catarina state, Brazil, and the other from about 80 km farther south in the same state.

Etymology. This species is named for the amber (*gemma* Latin) ground color. The name is doubly appropriate because *gemma* also translates to gem, which refers to the beauty and rarity of this species.

Remarks. This new species is known from only two specimens, both of which surprisingly come from very well collected regions of southeastern Brazil (R. A. St. Laurent & C. G. Mielke pers. obs.). Given that one specimen was collected in March and the other in November, we cannot consider a short flight period as the reason for the apparent rarity of this species, as we mentioned for *A. florianensis*. All *Auroriana*

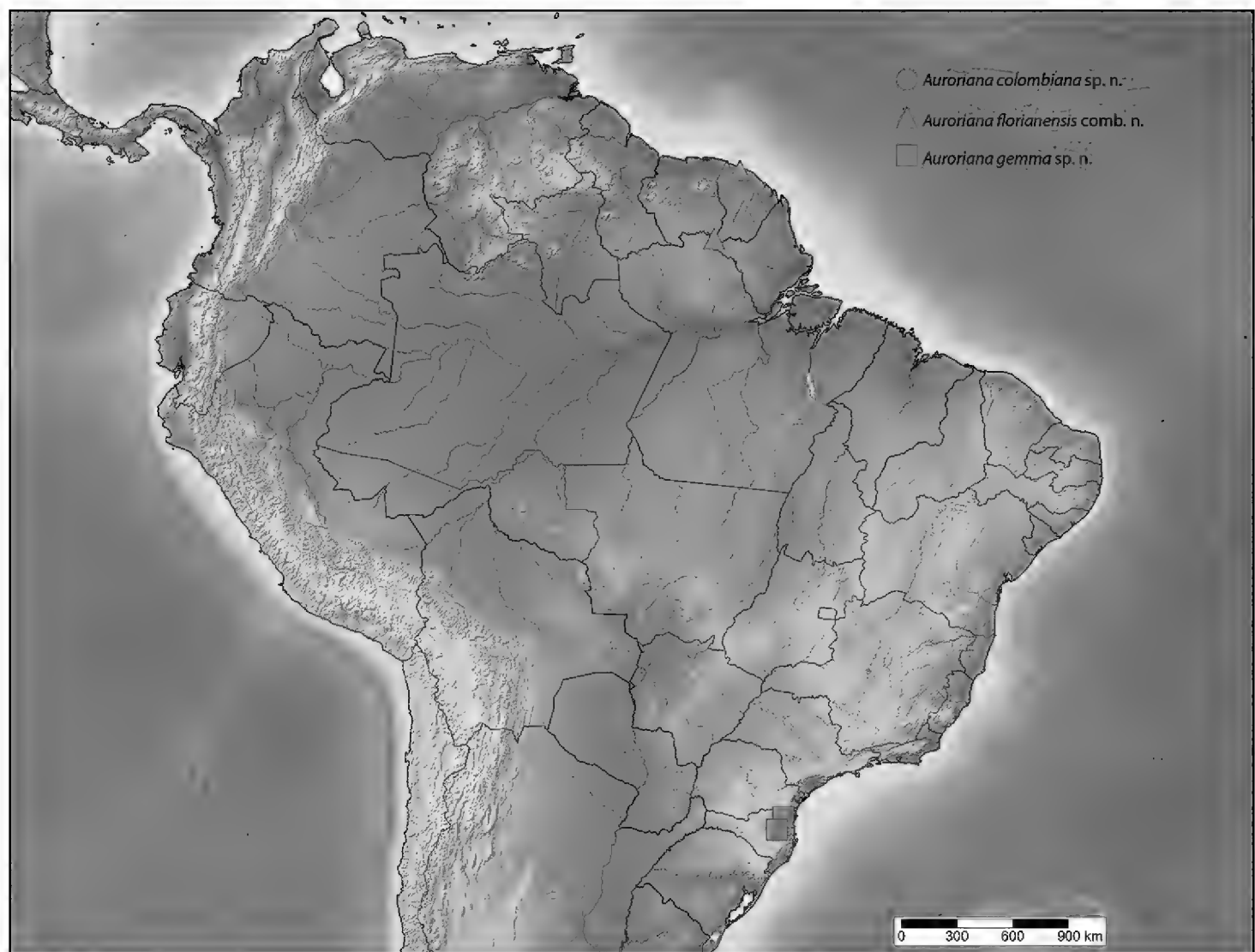


Figure 19. Distribution of *Auroriana*.

species are known from very few specimens, suggesting that *Auroriana* in general is not an easily collected genus or one that is merely overlooked by lepidopterists, as is much of the family.

***Micrallo* St Laurent & C. Mielke, gen. n.**

<http://zoobank.org/56E27AA5-B571-4CB7-8223-1DCD3AC7E381>

Type species. *Micrallo minutus* St Laurent & C. Mielke, sp. n.

Etymology. The genus name is based on the fact that the type species is remarkably small (*micro-* Latin), being one of the smallest in the family; + the ending *-llo*, which is shared with *Mimallo* Hübner, [1820], the type genus of Mimallonidae. The genus name is masculine.

Diagnosis. *Micrallo minutus* is immediately distinguished from all described Mimallonidae by the small size (forewing length: 11.5 mm) combined with the silvery-gray ground color and smooth wing margins. Genitalia are also unique in both sexes. Males have extremely complex genitalia with semi-membranous valves and lateral pockets encasing the valves. The pockets are filled with thick, elongate deciduous setae. Female genitalia have bent apophyses anteriores and long, robust apophyses poste-

riores that are connected to paired pouches that open on either side of the papillae anales. In the single examined female, one (the left hand pouch when viewed ventrally) of the two pouches was completely filled with elongate, thick setae that appear to originate from the male. *Cicinnus acuta* (Schaus, 1892) is superficially similar, but much larger and lacks the club-like valves and differentiated setae in lateral pouches of the male genitalia.

Description. Male. *Head:* Width roughly two thirds that of thorax, antenna bipectinate to tip; basal three rami pairs increasing in length from antennal base to roughly one fifth of antennal length where rami length is nearly constant for remainder of antenna until the final distal quarter, after which rami continuously decrease in length until terminus. Frons tan brown, labial palpus reduced, not extending beyond frons, second segment tufted, third segment highly reduced, indistinct. *Thorax:* Light gray, interspersed with darker petiolate scales, especially anteriorly. *Legs:* Gray brown, but tarsus darker brown, tibial spurs thin. *Forewing dorsum:* Forewing length: 11.5 mm, Wingspan: 23 mm, n = 1. Somewhat narrow, acutely triangular, apical third slightly concave, somewhat convex before tornus. Ground color light silvery gray, overall lightly speckled by dark petiolate scales. Antemedial line absent. Postmedial line light brown, angled outward from M_3 to Rs_3 , angled sharply towards costa immediately after passing Rs_4 , line straight from M_3 until posterior wing margin, outer edge of postmedial line lined with pale coloration, becoming darker at costa. Postmedial area darker graphite colored with pale pink-gray suffusion mesally. Discal mark black, oblique, somewhat ovoid in shape. *Forewing ventrum:* Similar to dorsum but browner medially, especially on costa; inner side of postmedial line with black suffusion, postmedial line more undulate than on dorsum. *Hindwing dorsum:* Coloration as for forewing dorsum, but browner, especially anteriorly; postmedial line more undulate than on forewing. *Hindwing ventrum:* Follows same pattern as forewing ventrum. Frenulum apparently absent or vestigial. *Venation:* Typical of Mimallonidae, very similar to *C. melsheimeri* but $Rs_3 + Rs_4$ much longer stalked. *Abdomen:* Short, extending slightly beyond hindwing tornus, almost tubular, coloration as for thorax but lighter gray ventrally. *Genitalia:* (Fig. 22), n = 1. Extremely complex; tegumen reduced, narrow, but with robust sclerotized margins. Vinculum circular, but heavily modified, variously connected to valves; pair of heavily sclerotized, curved, tusk-like structures originate near base of vinculum. Uncus reduced, bottle shaped. Gnathos as two unfused, outwardly sclerotized, inwardly membranous, elongated, tubular, mesally bent processes with two pairs of teeth mesally, two pairs basally. Valves highly modified, nearly absent, valves membranous proximal to vinculum, transitioning into club-shaped lobes distally, lobes extend nearly to apex of uncus. Base of valve with elongate, thick, deciduous, specialized setae, most of which contained in membranous fold laterally encasing valve-vinculum complex. Juxta partially fused to phallus, juxtal plate a reduced, roughly T-shaped structure embedded in anellus. Phallus simple, spade shaped (viewed dorsally), open dorsally, base with elongated, downward-angled process. **Female.** *Head:* As for male but antenna smaller overall with shorter rami. *Thorax:* As for male. *Legs:* As for male. *Forewing dorsum:* Forewing length: 11.5 mm,

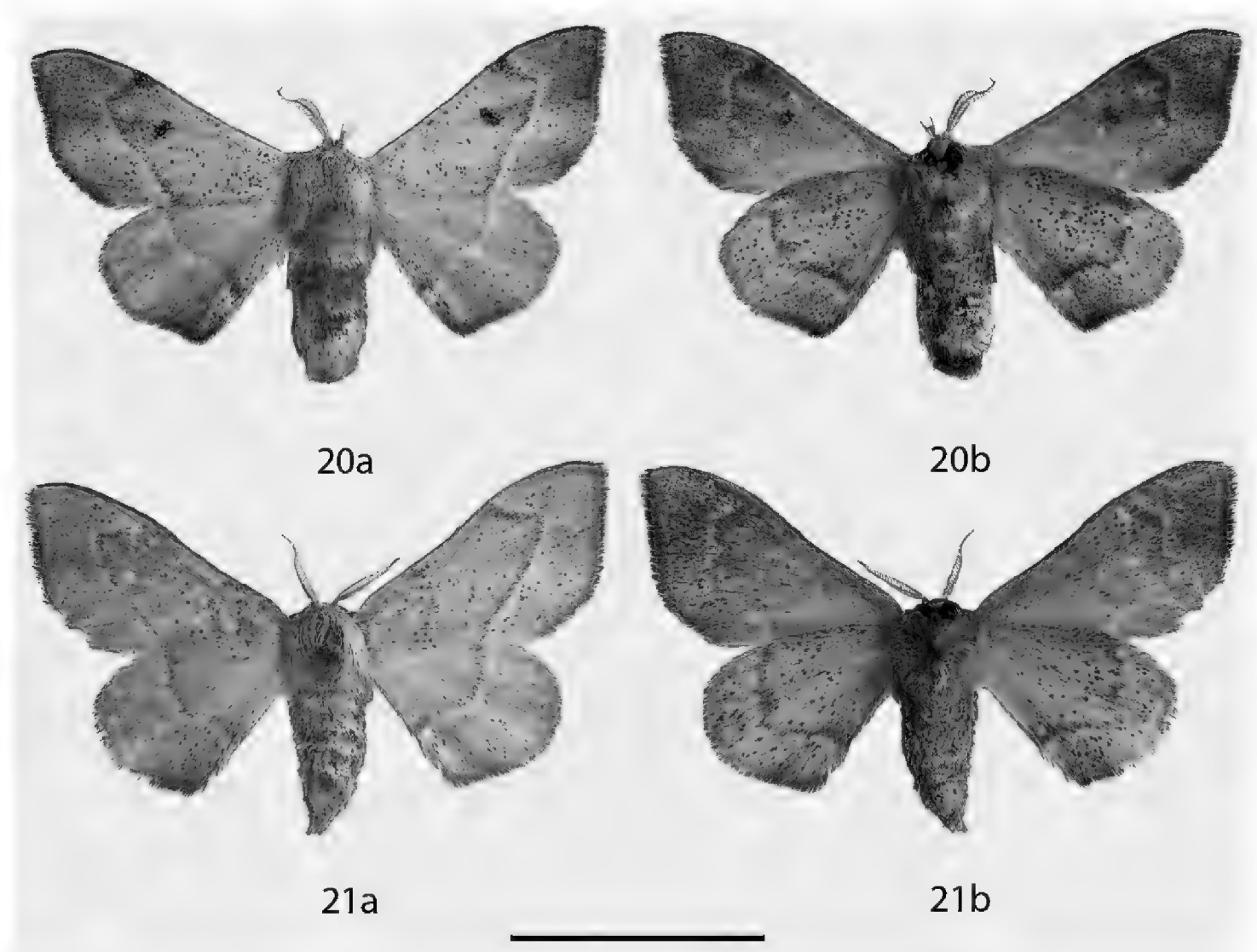


Figure 20, 21. *Micrallo minutus* adults, **a** dorsal, **b** ventral. **20** Holotype ♂, Brazil, Piauí, Oeiras, 200 m (DZUP) **21** Paratype ♀, Brazil, Piauí, Oeiras, 200 m (USNM). Scale bar = 1 cm.

Wingspan: 22 mm, n = 1. As for male but browner, discal spot absent. *Forewing ventrum*: Similar to dorsum but browner, especially anteriorly and medially; inner side of postmedial line with black suffusion, postmedial line more undulate than on dorsum. *Hindwing dorsum*: As for male but browner. *Hindwing ventrum*: Follows same pattern as forewing ventrum. Frenulum apparently absent or vestigial. *Abdomen*: As for male but slightly more robust; sternite VIII with quadrate U-shape formed by thin sclerotized band spanning width and length of segment. *Genitalia*: (Figs 23, 24), n = 1. Papillae anales small, rounded, covered in fine setae. Apophyses anteriores thin, distal third angled dorsally; apophyses posteriores, robust, nearly straight, twice length and width of apophyses anteriores. Ductus bursae same length as segment VIII, ostium unsclerotized. Corpus bursae bag-like, without any sclerotized structures. Dorsal sclerotization of tergite VIII complex, ridged, forming posteriorly directed point. Lamella antevaginalis a very large plate, nearly of equal width as segment VIII, with deep, wide, mesal indentation forming ostium. Pair of specialized, lateral pouches on either side of papillae anales, pouches connected to apophyses posteriores. Viewed ventrally, right pouch filled with elongated, deciduous setae, left pouch empty.

Remarks. An examination of *Cicinnus acuta* genitalia preparations (Franclemont genitalia prep. 1768 (CUIC) and St. Laurent diss.: 10-25-15:1) reveals minor simi-

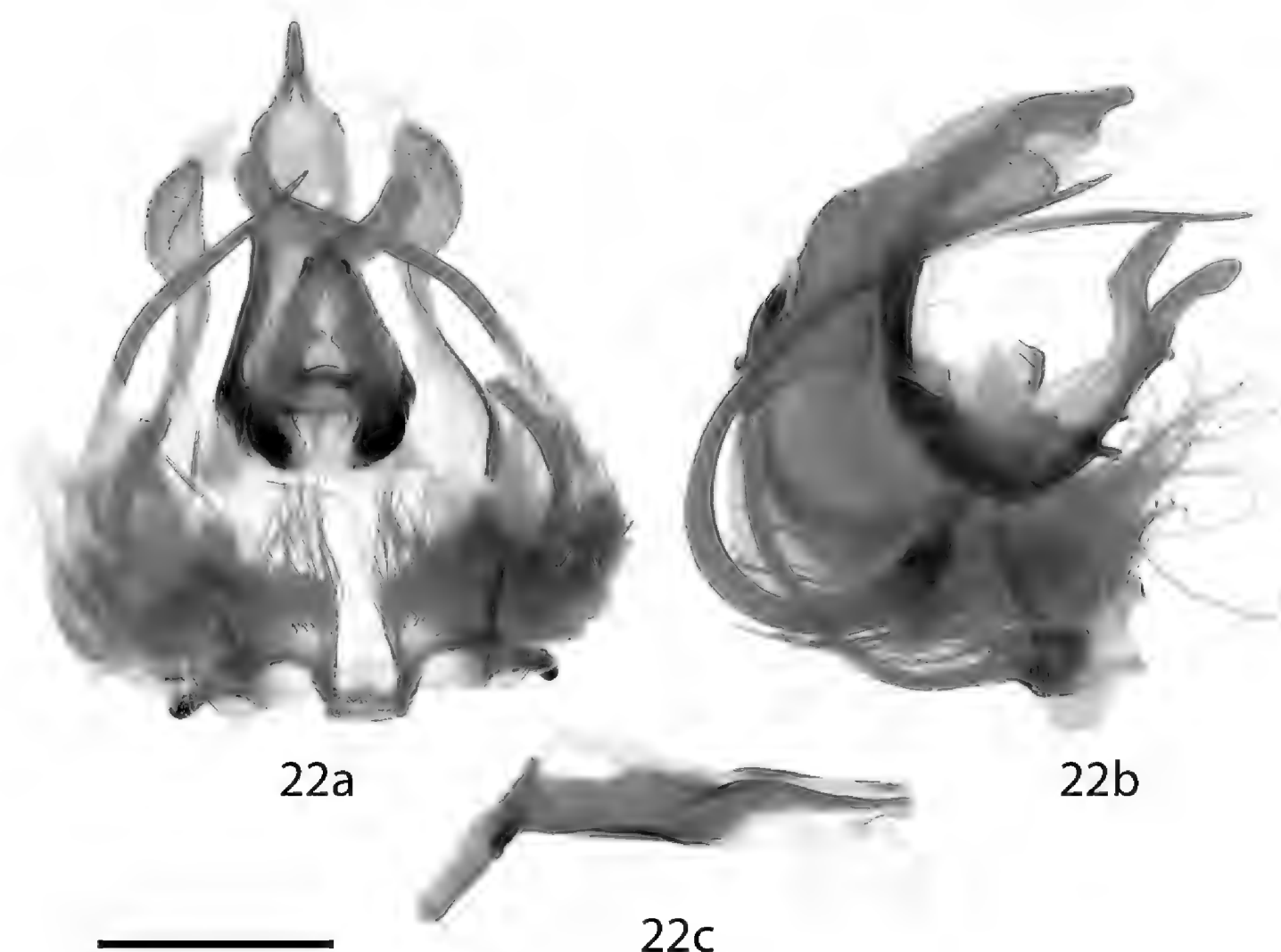


Figure 22. *Micrallo minutus* male genitalia, **a** ventral, **b** lateral, **c** phallus. Holotype ♂, Brazil, Piauí, Oeiras, 200 m [St. Laurent diss.: 10-21-15:1] (DZUP). Scale bar = 1 mm.

larities in the shape of the phallus, wherein both species the phallus is rather flattened and spade shaped when viewed dorsally. *Cicinnus acuta* differs, however, in all other respects of genitalia structure, namely in the presence of well-defined valves, much shorter gnathos processes, and in the presence of sharp, almost pincer-like structures at the base of the valves.

***Micrallo minutus* St Laurent & C. Mielke, sp. n.**

<http://zoobank.org/B04B1CB2-8C94-4323-AD47-13A6A4404975>

Figs 20–25

Type material. Holotype, ♂: BRASIL: PI [Piauí], Oeiras. 200 m, 12.iv.1994, V.O. Becker Col/ Col. Becker 92248/ USNM-Mimal: 2376/ St. Laurent diss.: 10-21-15:1/ DZ 32.730/ HOLOTYPE male *Micrallo minutus* St Laurent and C. Mielke, 2016 [handwritten red label]/ (ex. USNM, to be deposited in DZUP). Type locality: Brazil: Piauí: Oeiras.

Paratype, 1 ♀: **BRAZIL: Piauí:** Oeiras, 200 m: 12.IV.1994, V.O. Becker Col., Col. Becker 92248, USNM-Mimal: 2377, St. Laurent diss.: 10-21-15:2 (USNM).

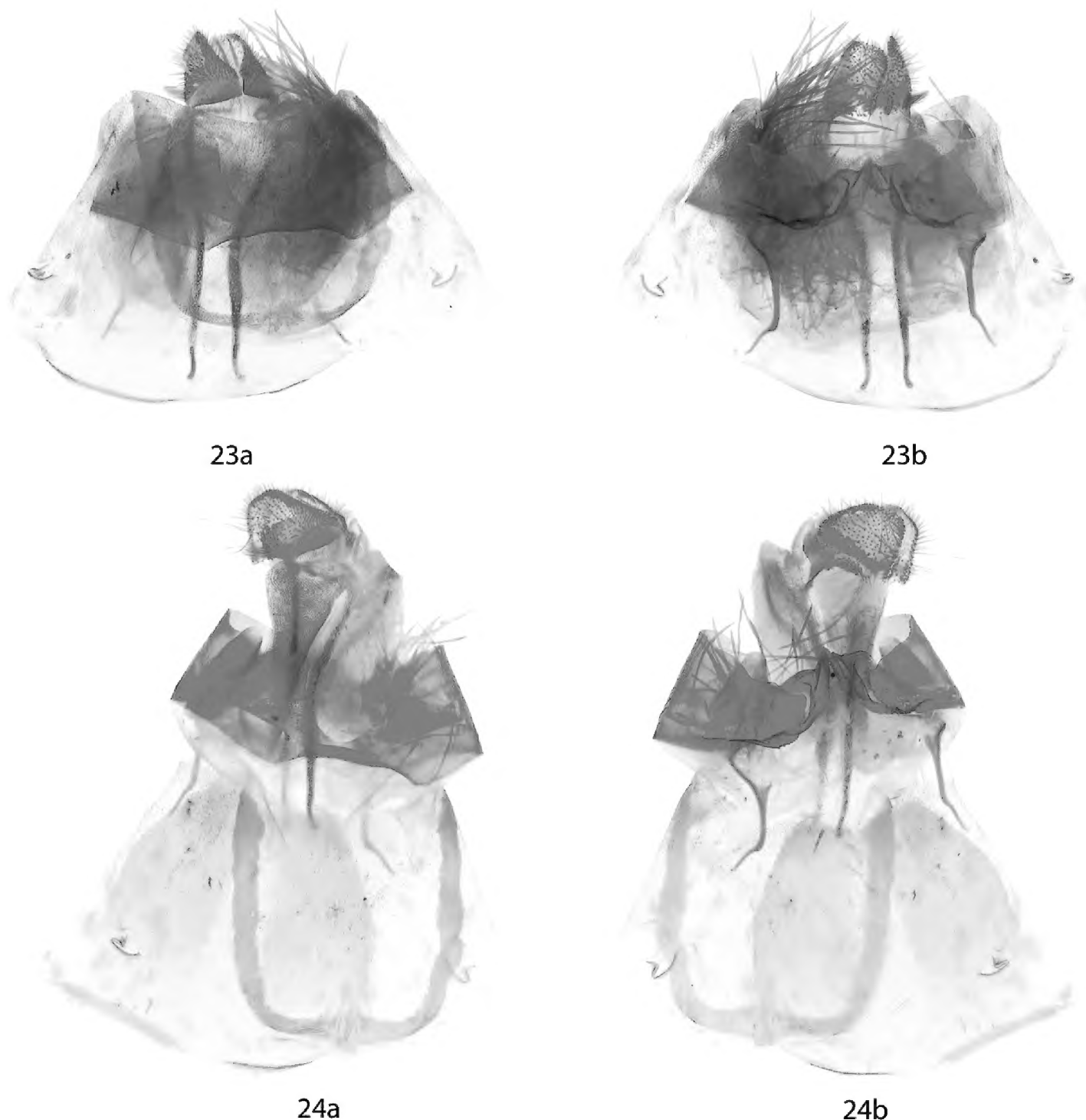


Figure 23, 24. *Micrallo minutus* female genitalia, **a** ventral, **b** dorsal. **23** Paratype ♀, Brazil, Piauí, Oeiras, 200 m, before extension [St. Laurent diss.: 10-21-15:2] (USNM) **24** As for Figure 23, after extension. Scale bar = 1 mm.

Paratype with the following yellow label: PARATYPE female *Micrallo minutus* St Laurent and C. Mielke, 2016.

Diagnosis. See genus diagnosis.

Description. See genus description.

Distribution (Fig. 25). The unique species in the genus *Micrallo* is so far known only from the type locality at Oeiras, Piauí, Brazil. This location is interesting because it lies on the edge of both Cerrado and Caatinga biomes (IBGE 2004).

Etymology. *Micrallo minutus* is named for its minute (*minutus* Latin) size, making it one of the smallest described species in the family.

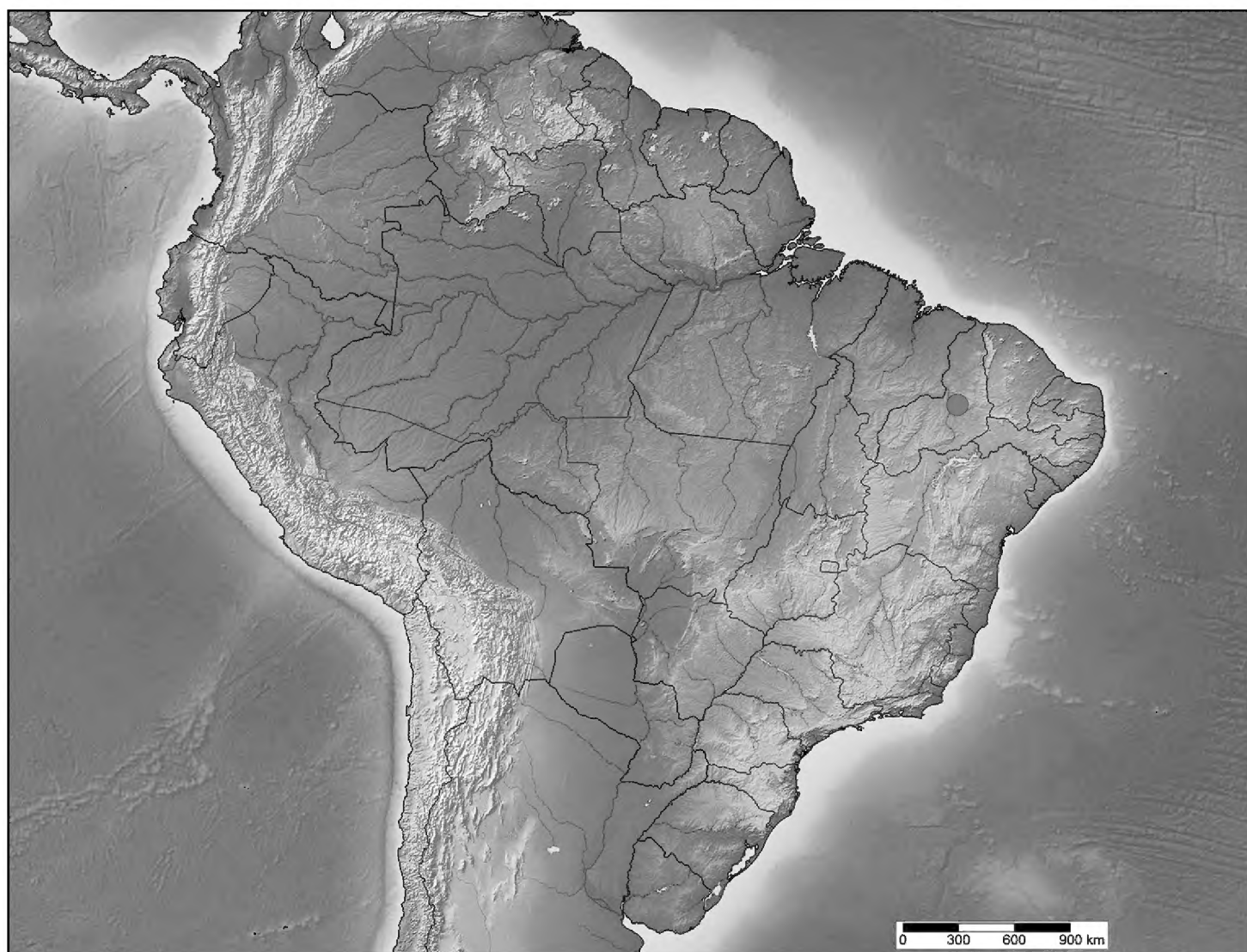


Figure 25. Distribution of *Micrallo minutus*.

Remarks. Due to the interesting habitat at the type locality of *M. minutus*, it is not surprising that this taxon represents a previously undescribed species in a new genus. Both Caatinga and Cerrado biomes are incredibly undersampled (C. G. Mielke & R. A. St. Laurent pers. obs.), with the latter biome recently proven to support many new and endemic Mimallonidae species (Herbin and Mielke 2014). As of yet, no study has been published to determine the degree of Mimallonidae endemism to Caatinga.

The highly specialized genitalia in both sexes are unique among Mimallonidae. The complicated male genitalia bear two pouches on either side of the semi-membranous valves that contain many thick, specialized setae that are prone to falling out when the genitalia are examined. The female, likewise has rather complicated genitalia for female Mimallonidae, and also has specialized pouches, one on each lateral side of the papillae anales. In the single available female specimen, the right (when viewed ventrally) pouch contained an abundance of the same setae, the pouch was so completely filled that many of the setae are extending outside the pouch. See Fig. 23 for the genitalia before extension of the final abdominal segment. After extension (Fig. 24), most of the setae were expelled from the pouch. Close examination shows that the female genitalia are not asymmetrical, but that the second pouch was simply never filled with setae, or if it did contain setae at one time, they were completely lost before our examination. It is possible that these setae have characteristics pertinent to copulation, although we are unable to determine their

exact purpose. It is interesting that only one pouch was filled, suggesting that females of *M. minutus* are capable of mating two or more times. Perhaps even more intriguing is the fact that males may be able to fill only one female pouch at a time, despite possessing two complimentary pouches of their own on either side of the genital capsule.

Acknowledgements

We would like to thank John Brown (USNM) for access to specimens and facilitating the donation of the holotype of *Micrallo minutus* to DZUP. Alessandro Giusti at The Natural History Museum, London, provided access to important specimens and performed the necessary dissection and photography of the *Tostallo albescens* holotype. We would also like to thank Joël Minet (MNHN) for access to specimens and photographs of *Auroriana florianensis*, Philippe Collet (France) for photos of *A. florianensis* and the donation of a specimen to the first author for detailed examination, and Christian Gibeaux (France) for kindly preparing and photographing the female genitalia of *A. florianensis*. Marcelo Duarte (MZSP) and Rafael Dell’Erba facilitated the loan and examination of the *A. gemma* paratype. Ana P. S. Carvalho (University of Florida) helped name *A. gemma* and offered valuable suggestions to the manuscript. Jason Dombroskie (CUIC) provided access to the collection’s camera equipment and stacking software, as well as helpful feedback on the manuscript. Finally, we would like to thank the Hunter R. Rawlings III Cornell Presidential Research Scholars program for providing funding to the first author for this and ongoing research with Mimallonidae.

References

- Becker VO (1996) Mimallonidae. In: Becker VO, Carcasson RH, Heppner JB, Lemaire C (Eds) Atlas of Neotropical Lepidoptera, Checklist. Part 4B. Drepanoidea, Bombycoidea, Sphingoidea. Association for Tropical Lepidoptera & Scientific Publishers, Gainesville, Florida, 17–19.
- Franclemont JG (1973) Mimallonoidea (Mimallonidae) and Bombycoidea (Apatelodidae, Bombycidae, Lasiocampidae). In: Dominick RB, Ferguson DC, Franclemont JG, Hodges RW, Munroe EG (Eds) The moths of North America north of Mexico fasc. 20.1. E.W. Classey Ltd. and Richard B. Dominick Publ., London.
- Google Earth (2015) Google Earth (Version 7.1.5.1557). <http://www.google.com/earth/download/ge/> [Software]
- Herbin D (2012) Descriptions of a new genus and ten new species of Mimallonidae (Lepidoptera: Mimallonoidea). The European Entomologist 4(1): 1–31.
- Herbin D (2015) Description de nouvelles espèces d’Hétérocères de Guyane française avec notes taxinomiques (Lepidoptera Mimallonidae et Apatelodidae). Antenor 2(1): 81–105.

- Herbin D, Mielke CG (2014) Preliminary list of Mimallonidae from Feira Nova do Maranhão, Maranhão, northern Brazil with descriptions of some new species (Lepidoptera Heterocera Mimallonoidea). *Antenor* 1(2): 130–152.
- Herbin D, Monzón Sierra J (2015) Description of four new species of Mimallonidae and four new species of Apatelodidae from the El Mirador Basin in northern Guatemala. *Antenor* 2(2): 176–197.
- IBGE (2004) Mapa de Biomas e de Vegetação. Instituto Brasileiro de Geografia e Estatística. <http://www.ibge.gov.br/home/presidencia/noticias/21052004biomashtml.shtm> [10/25/2014]
- Jones ED (1912) Descriptions of New Species of Lepidoptera-Heterocera from South-East Brazil. Transactions of the Entomological Society of London, London, 435 pp.
- Kristensen NP (2003) Skeleton and muscles: adults. In: Kristensen NP (Ed.) *Lepidoptera: Moths and Butterflies 2. Handbuch der Zoologie/Handbook of Zoology IV/36*, Walter de Gruyter, Berlin & New York, 39–131. doi: 10.1515/9783110893724.39
- Lafontaine JD (2004) The moths of North America. Noctuoidea: Noctuidae (part). Noctuinae (part — Agrotini). Fasc. 27.1. In: Dominick RB, Ferguson DC, Franclemont JG, Hodges RW, Munroe EG (Eds) *The moths of North America*. Wedge Entomological Research Foundation, Washington, DC, 385 pp.
- Pearson HR (1951) Contribuição ao conhecimento do gênero “*Mimallo*” Hübner, 1920 (Lepidoptera, Mimallonidae). *Revista Brasileira de Biologia*, Rio de Janeiro 11: 315–332.
- Pearson HR (1984) Sobre o gênero *Tolypida* Schaus, 1928 (Lepidoptera, Mimallonidae) com descrição de nova espécie. *Revista Brasileira de Entomologia*, Rio de Janeiro 28: 459–464.
- Schaus W (1928) Familie Mimallonidae. In: Seitz A (Ed.) *Die Gross-Schmetterlinge der Erde*. 6. Die amerikanischen Spinner und Schwärmer. A. Kernen, Stuttgart, 635–672.
- Shorthouse DP (2010) SimpleMappr, an online tool to produce publication-quality point maps. Available from: <http://www.simplemappr.net> [Date of access: 11/17/2015]
- St Laurent RA, Dombroskie JJ (2015) Revision of the genus *Eadmuna* Schaus, 1928 (Lepidoptera, Mimallonidae) with a description of a new species from French Guiana. *ZooKeys* 494: 51–68. doi: 10.3897/zookeys.494.9208